PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 4 : E05G 1/00, 1/12, E05B 47/00 E05B 49/00 — A1

(11) International Publication Number: WO 87/ 03034

(43) International Publication Date: 21 May 1987 (21.05.87)

(21) International Application Number: PCT/SE86/00511

(22) International Filing Date: 7 November 1986 (07.11.86)

(31) Priority Application Number: 8505303-1

(32) Priority Date: 8 November 1985 (08.11.85)

(33) Priority Country: SE

(71)(72) Applicant and Inventor: SIGHOLM, Folke [SE/SE]; Box 29030, S-100 52 Stockholm (SE).

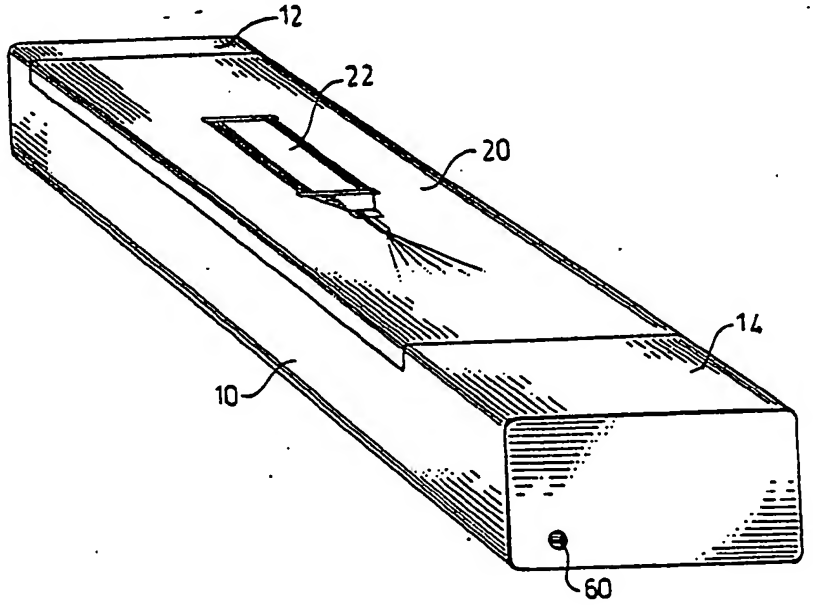
(72) Inventor; and
(75) Inventor/Applicant *(for US only)* : ASPLUND, Bengt [SE/SE]; Box 29030, S-100 52 Stockholm (SE).

(74) Agent: SEDVALL, Bengt; B. Sedvall Patentbyrå, Box 7182, S-103 88 Stockholm (SE).

(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (European patent), IT (European patent), LU (European patent), NL (European patent), NO, SE (European patent), US.

Published
With international search report.
In English translation (filed in Swedish).

(54) Title: DEVICE FOR SAFE CUSTODY AND TRANSPORT OF VALUABLES



(57) Abstract

A device for transport and safe custody of valuables, such as, for example, banknotes, and comprising a container (10) which is provided with a lid (20), which can be locked onto the container in closed position by means of a locking mechanism (40). The mechanism (40) is controlled electrically and includes a code lock (46, 50), which is devised to be actuated by an external energy source for supply of current and sensitization of the code lock, said code lock (46, 50) in addition being subjected to sensitization by a code emitter (70) and opening on a correct signal so that the lid (20) of the container (10) can be removed.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	ML	Mali
AU	Australia	GA	Gabon	MR	Mauritania
BB	Barbados	GB	United Kingdom	MW	Malawi
BE	Belgium	HU	Hungary	NL	Netherlands
BG	Bulgaria	IT	Italy	NO	Norway
BJ	Benin	JP	Japan	RO	Romania
BR	Brazil	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic			SE	Sweden
CG	Congo	KR	Republic of Korea	SN	Senegal
CH	Switzerland	LI	Liechtenstein	SU	Soviet Union
CM	Cameroon	LK	Sri Lanka	TD	Chad
DE	Germany, Federal Republic of	LU	Luxembourg	TG	Togo
DK	Denmark	MC	Monaco	US	United States of America
FI	Finland	MG	Madagascar		

DEVICE FOR SAFE CUSTODY AND TRANSPORT OF VALUABLES.

The present invention relates to a device for safe custody and transport of valuables, such as, for example, banknotes, and comprising a container which is provided with a lid, which is lockable to the container by means of a lock mechanism.

It is known to use for safe custody and transport of currency notes lockable cassettes provided with locking mechanisms and containing a colouring fluid cartridge which is released upon damage being done to the cassette, whereby the notes are made unfit for use. Such cassettes are intended to replace the flexible so-called bank bags which are used for transport of banknotes from shops and stores to the night depository of the bank, since such bags do not afford any protection whatever against theft of the content.

One problem inherent to cassettes of the type in consideration is to achieve a locking of the lid of the cassette, which locking is burglar-proof and thus makes impossible that the cassette is opened in other way than by applying violence in which case the colour cartridge is released. In this connection it has been proposed to equip cassettes or bags for transport of valuables with code operatable locks which are opened in a bank or similar establishment by means of a control unit on which the bank staff types the opening code. The drawback inherent to this proposal is firstly that problems arise when the correct code is not marked in the control unit - in which connection it has been proposed that the colour cartridge is released after some few attempts - and secondly that the code becomes known to a plurality of persons in the bank which can involve a security risk. According to another proposal

a coded lock washer is used for the locking of the lid of the cassette and another coded washer is used for releasing the first coded washer and opening the lid of the cassette.

The main object of the present invention is to simplify further the locking mechanism of the cassette while maintaining and even increasing the security against unwarranted opening, which is achieved thereby that the device has received the characteristic features stated in the subsequent claims.

The invention will be described nearer hereinafter with reference to an embodiment shown in the attached drawings.

Figure 1 shows the cassette according to the invention with attached lid, i.e. in the position for transport. Figure 2 is a perspective view of the cassette of Figure 1 without lid. Figure 3a shows the lid of the cassette viewed from the underside, whereas Figure 3b shows a lateral view of the lid. Figure 4 shows an exploded sketch of the end of the cassette containing an operating member for the locking mechanism. Figure 5 shows a view seen in the direction of the arrows V-V in Figure 4. Figure 6 shows a view seen in the direction of the arrows VI-VI in Figure 4. Figure 7 shows a view seen in the direction of the arrows VII-VII in Figure 6. Figure 8 shows a lateral view of a control apparatus for the opening of the cassette. Figure 9 shows a bottom view of the apparatus of Figure 8.

The cassette shown in the Figures 1 and 2 comprises a box-resembling container 10 which on one end has a raised portion 12 containing a slot 16 for insertion of a corresponding flange 18 on the lid 20 (Figures 3a, 3b) of the cassette which will be described nearer more below. On its opposite end the cassette is formed with a cavity 14 which contains the operating member to be described nearer more below.

The cavity closed at the top is raised also over the longitudinal sides of the cassette 10 so that the lid 20 connects with these raised portions when it is put on the container 10, as is evident from the Figure 1. The lid may have a token 22, such as e.g. a founded effigy of a colour spraying cartridge showing that the content of the cassette is protected against stealing by staining. As previously mentioned, the lid 20 of the cassette which is shown in the Figures 3a and 3b, is formed with a flange 18 intended to be inserted into the slot 16 of the container 10, and on the opposite end a flange 24 provided with an opening 26 for the locking tongue 32 (Figure 4) of the locking mechanism, which will be described more below. Embedded in the lid 20 are loops 28 of an electric wire, which loops are connected with sheet metal shields 30 on those parts which are in contact with the container 10, i.e. the flanges 18 and 24 of the lid. Corresponding sheet metal shields are provided in the slot 16 and on the operating member against which the flange 24 of the lid 20 abuts when the lid is closed. The loops 28 cover the entire surface of the lid and are located so closely together that all efforts to knock holes into the lid by means of tools will result in interruptions in one loop or more loops, whereby the colour cartridge is released.

The container or banknote box 10 of the cassette is equipped also with loops (not shown) of some electricity conducting material so that neither the container 10 can be exposed to exterior force without interruption of the electric circuit of which the loops constitute a part. It is evident from the aforesaid that the container 10 and the lid 20 of the cassette are of a non-conductive material which even must stand to rough manipulation when the cassette is thrown into e.g. a night box of the bank, and a suitable material is rigid plastics, the current carrying loops then being embedded in, or welded on, the plastics container 10 and the lid 20. Of course, it is possible also, if desired,

to manufacture the cassette from metal, such as steel, it then being necessary, however, to insulate the contact system with its sheet metal shields and loops from the rest of the container.

The cavity 14 of the cassette container 10 encloses an operating member for the locking mechanism and electronics, as is shown in Figure 4. The operating member comprises a casing 34 having such external dimensions that it can be introduced into the cavity 14, where it is retained in place by a screw (not shown), which passes through a hole 36 in the outer side of the cassette and is threaded into a bush 38 in the casing 34. This bush and the screw driven down are connected to the electric circuit so as to cause this circuit to become interrupted when the screw possibly is loosened. In the cassette made ready for use the screw head at the exterior surface of the cassette is concealed by a layer of plastics, lacquer or the like so as to be invisible. Of course, the casing may also be fixed by means of screws from the interior of the container 10, the screws then being connected to the electric circuit of the cassette in the same manner so as to cause the circuit to become interrupted when the screw or screws are loosened or removed so that the colour cartridge is activated. After that the casing 34 of the operating member has been mounted in the cavity 14 and fixed in the bush 38, it is normally not necessary to remove it from the cavity earlier but when service and exchange of batteries shall be performed in the cassette.

The casing 34 of the operating member encloses an electrically controllable locking mechanism 40, a colour cartridge or colour shell 42, two batteries 44, a microprocessor 46 and an inductance coil 46 and also a radiation receiving diode 50. 52 denotes the conducting system which interconnects the various components of the operating member.

As is evident from Figure 5, the casing 34 is open at the back so that it is possible when the casing 34 has been removed from the cavity 14 and uncovered, to replace the batteries 44 and also, if desired, the colour cartridge 42 when the cassette undergoes service or after release of the colour cartridge. There is further on the front side of the casing 34 a notch 58 through which the locking tongue 32 passes into the opening 26 in the flange 24 when the lid 20 has been put on and locked. This notch 58 can also receive the other flange 18 of the lid 20 when the lid has been placed onto the container 10 in a position rotated by 180° relatively to the locking position for transport of the cassette, as will be described nearer more below. The shown lid 20 thus is of the type which is put onto the container from above and is squeezed against the same. Other embodiments may of course be used, such as, for example, a sliding lid, which is pushed in from one end of the container into two longitudinally extending slots in the sides of the container.

The described cassette for articles of value is operated in the following manner: In the shown embodiment the lid 20 is applied in one of two positions. In the first position, the transport position, the flange 18 of the lid 20 engages the recess 58, whereas the opposite end of the lid is directed against, and lowered in relation to, the raised portion 12. The lid is retained in this position by friction or by means of a spring clip or the like, and in order to facilitate lifting of the lid by the user, the side or sides of the lid are knurled. After that the valuables which shall be protected, such as, for example, banknotes from a shop cash, have been deposited in the cassette, the lid is rotated by 180 degrees so that the flange 18 engages the slot 16 and the flange 24 is lowered to a position adjacent the recess 58 in the casing 34 of the operating member. By contact of

the sheet metal shields 30 with corresponding shields (not shown) in the slot 16 and on the operating member 34 the electric circuit is closed and the locking mechanism becomes automatically operative and the electronics are made active, which is indicated by a buzzing sound or "peep" from the microprocessor 46. Now, the lid cannot be lifted off any longer, and any possible action directed against the cassette will result in that the colour shell 42 is caused to burst so that the banknotes become coloured and unfit for use. This is effected thereby that the electric circuit interrupted either by the lid being broken loose under application of violence so that the sheet metal shields lose the contact with the electric conduction system 52 or that the loops 28 are damaged by attempts to penetrate into the interior walls of the container 10 or through the lid 20.

For opening of the cassette, for example in a bank where the cassette has been conveyed in locked condition, it is necessary, according to the invention, that two operations are performed simultaneously. By means of an external power source the inductance coil 48 for the locking mechanism 40 is acted upon, whereby the radiation receiving diode 50 is supplied with electric energy and is sensitized thereby. In this condition the diode waits for a correct signal which is coded and which is transferred from a transmitter in the bank to the diode 50. If the signal is the right one and agrees with the code stored in the microprocessor 46, the diode emits a signal to the locking mechanism so that the lock is opened and the lid 20 can be removed from the container 10. Thereunder the buzzer enclosed in the microprocessor sounds again so that the bankclerk opening the cassette becomes aware that the lid can be opened without the colour cartridge 42 being released.

It becomes clear from the aforesaid that two electric circuits are used for operation of the described cassette. The exchange-

able batteries 44 enclosed therein supply the electric circuit 52 with energy during the transport of the cassette in closed position, and for this purpose a very feeble current is sufficient, which affords long endurance to the batteries 44. The locking mechanism and the code reading means must, however, be fed with current from an external energy source via the inductance coil 48 when the cassette shall be opened. In the shown and described embodiment it is assumed that infra-red light is used for sensitization of the code lock of the cassette, and in the embodiment with container of plastics the light passes through the plastics casing to the receiving diode 50. In connection with other types of containers, such as metallic ones, and/or certain types of radiation source, there may be provided, in order to render possible that the ray from the emitter can be received by the radiation reading diode 50, a hole 60 in the end wall of the cassette container 10 straight in front of the diode.

As mentioned, it has been assumed for the described embodiment that the source of radiation is infra-red light, but it will be obvious that other sources of radiation are conceivable, in which connection may be mentioned in addition to infra-red light ultra-sound, laser radiation or combinations thereof. The exterior energy source for supply of the necessary energy may be constituted by a current supply with direct contact to the cassette or a magnetic alternatic current field or some other supply of energy by induction or magnetism or combinations thereof. In those cases where the supply of energy is effected by induction or magnetism, this supply can also be made in coded manner, so that in practice two coded signals must be transmitted to the cassette before the lock can be opened.

In order to in a simple manner create the operations necessary for the opening of the cassette e.g. in a bank, there is provided according to still a characteristic feature of the invention an opening apparatus, which is shown in the Figures 8

and 9. This apparatus, which appropriately is stationarily mounted in the bank office, for example fastened with screws 62, comprises a bottom 64 and two gable parts 66, 68, of which one contains a magnetic field generator for that case that the power supply is constituted by a magnetic alternating current field, and a radiation emitter diagrammatically shown at 70 for sensitization of the code lock 40 of the cassette. The current supply emanates from the electric mains over a flex 72 and the sensitization of the apparatus by means of a press button 74 on the top side. Suitably there is provided on the top side also an indication of position so that the cassette can be installed in correct position, whereafter the opening apparatus is sensitized by operation of the press button 74, so that the lid 20 can be removed from the cassette casing 10 as soon as the buzzer has reported that the lock has been opened. Most suitably the opening apparatus is provided with a specific code for each bank office or other financial institution so that cassettes from other banks or similar institutions cannot be opened by means of the same opening apparatus. The code in the opening apparatus and appartaining cassettes are deposited in fixed storages and stored in every cassette and in the apparatus so as to make them unaccessible from outside. The code is produced by e.g. a computer and is stored in the fixed storages and remains in this way concealed to anybody in the bank or other staff members working with the cassettes.

Of course, the embodiment shown and described above is an example only of realization of the invention, and changes may be made within the scope of the following claims. Although the invention has been described with reference to a cassette for banknotes, it can, of course, be applied to larger transport bags for valuables also.

CLAIMS

1. A device for safe custody and transport of valuables, such as e.g. banknotes, and comprising a container which is provided with a lid, which is lockable to the container in closed position by means of a locking mechanism, c h a r a c t e r i z e d in that the locking mechanism is controlled electrically and includes a code lock which is devised to be operable by an external energy source for supply of electric current and sensitization of the code lock, the code lock being controllable in addition by a code emitter located outside the cassette and opening in response to a correct signal so that the lid of the container can be removed.

2. A device according to claim 1, c h a r a c t e r i z e d in that the container and the lid are equipped with embedded loops of an electric circuit which is fed by batteries embedded in the container, and that the container and the lid have sheet metal shields for closing the electric circuit when the lid is applied, the locking mechanism then also being switched in in such a manner that the lid is locked onto the container when the sheet metal shields meet.

3. A device according to claims 1 or 2, c h a r a c t e r - i z e d in that the container has a box-like shape and at its one end is formed with slots for insertion of one end of the lid, while the opposite end of the container contains an operating member, within which the locking mechanism and the interior current applying means are placed.

4. A device according to any of the claims 1 to 3, c h a r a c t e r i z e d in that the code lock and the emitter work with infra-red light, ultra-sound, laser radiation or combinations thereof, and that the exterior energy source is constituted by a transmitter of modulated energy of inductive and/or magnetic nature.

5. A device according to any of the claims 1 to 4, c h a r a c t e r i z e d in that the code lock is connected to a buzzer member which sounds while the code lock opens or locks.

6. A device according to any of the claims 1 to 5, c h a r a c t e r i z e d in that the lid of the container is attachable to the container in two positions rotated relatively each other by 180 degrees, the code lock in the one position for transport of the empty container not being sensitized and the lid attached to the container by friction, whereas the code lock is sensitized in the other position of the lid for locking of the lid to the container during transport of valuables.

7. A device according to any of the claims 1 to 6, c h a r a c t e r i z e d in that the container contains a colour cartridge with a release mechanism connected to the electric circuit of the container and the lid when the lid is locked to the container, an interruption of the electric circuit releasing the colour cartridge so as to cause colouring of the content of the container.

8. A device according to any of the claims 2 to 7, c h a r a c t e r i z e d in that the locking mechanism is placed in a separate operating member, which is fixed inside the container and that the fixing members form part of the electric circuit of the container so as to cause a removal of the fixing members resulting in an disruption of the electric circuit.

9. Opening contrivance for a device according to any of the claims 1 to 8, c h a r a c t e r i z e d in that it contains a magnetic field generator for producing a magnetic alternating current field and a code emitter devised to actuate the code lock of the device.

10. Device according to claim 9, c h a r a c t e r i z e d in that it is constructed as a stand supporting the container, said stand being connected to the electric circuit and operated by means of a press-button.

Fig.1

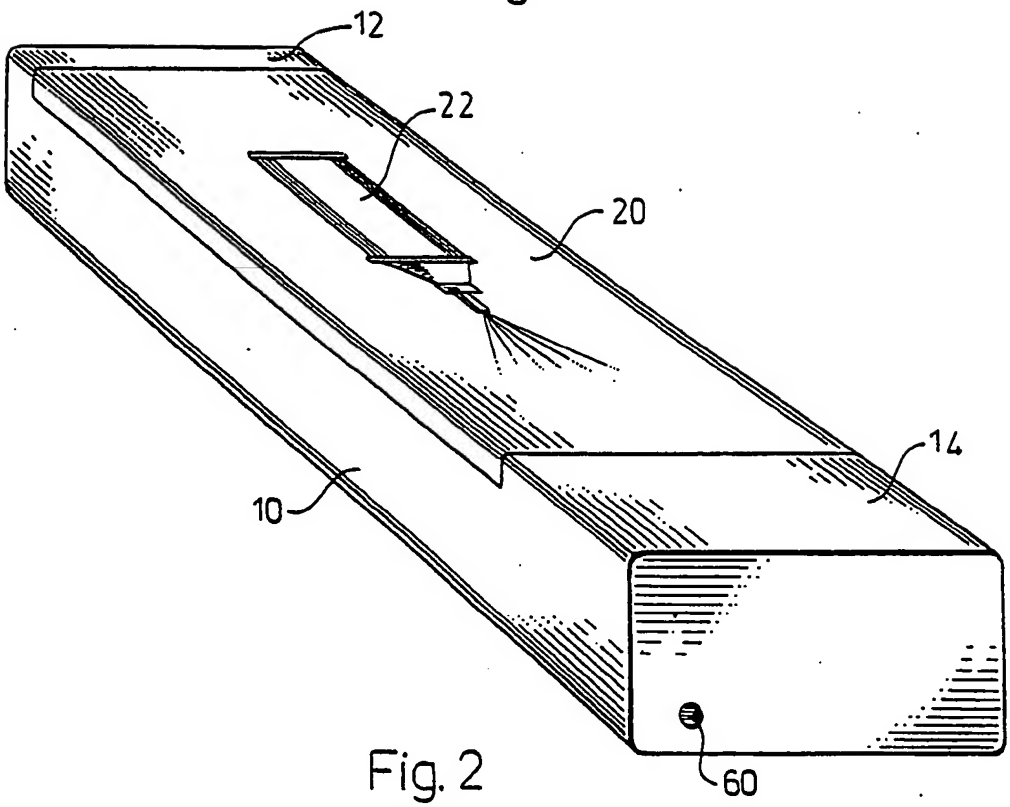


Fig. 2

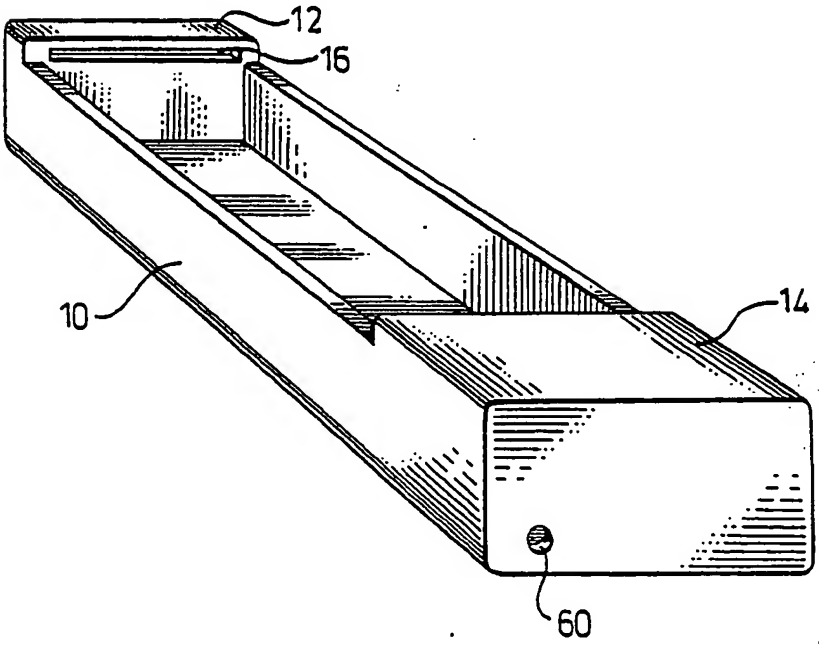


Fig. 3a

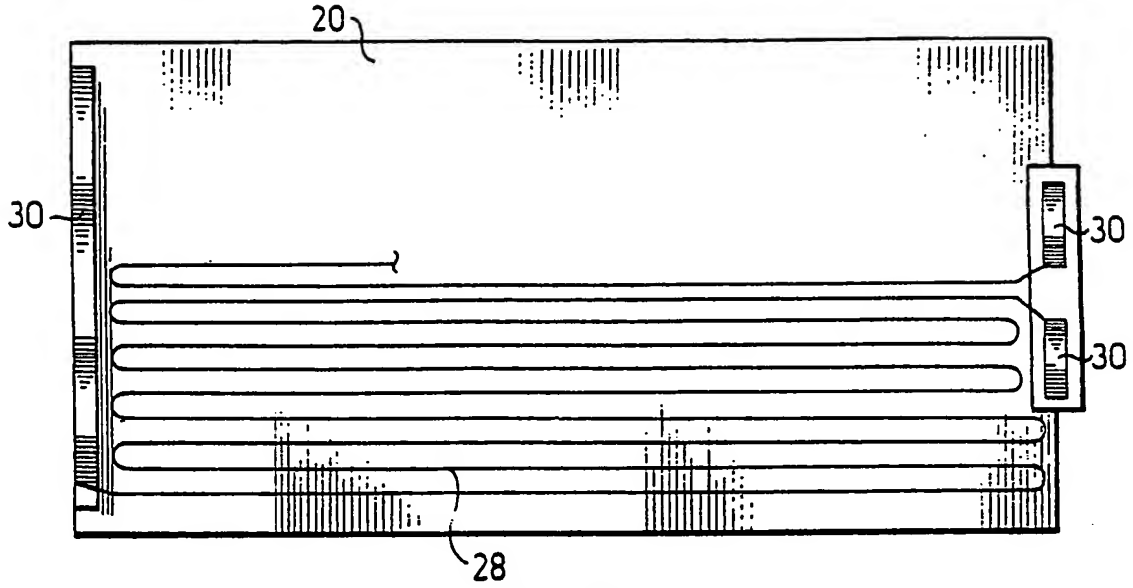


Fig. 3b

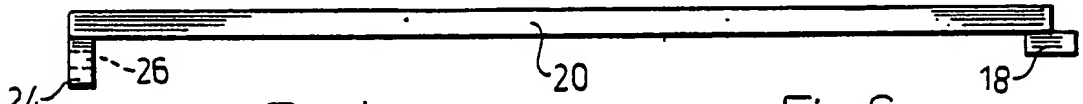


Fig. 4

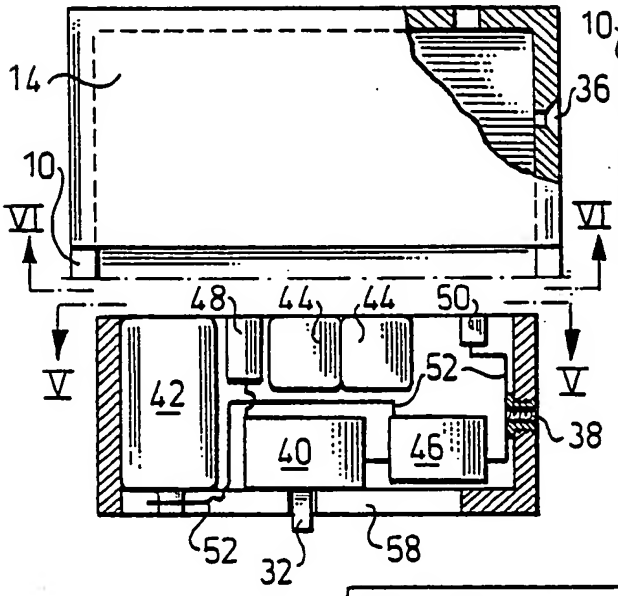


Fig. 6

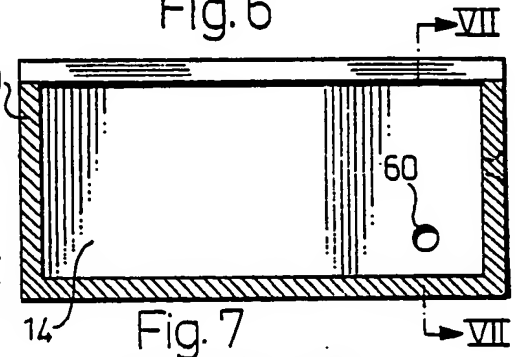


Fig. 7

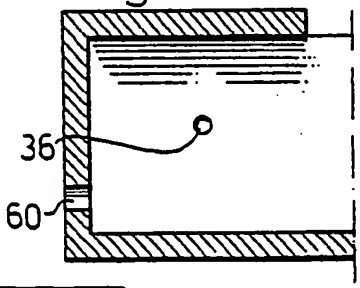


Fig. 5

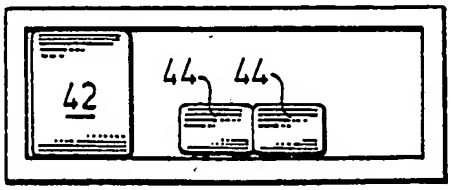


Fig. 8

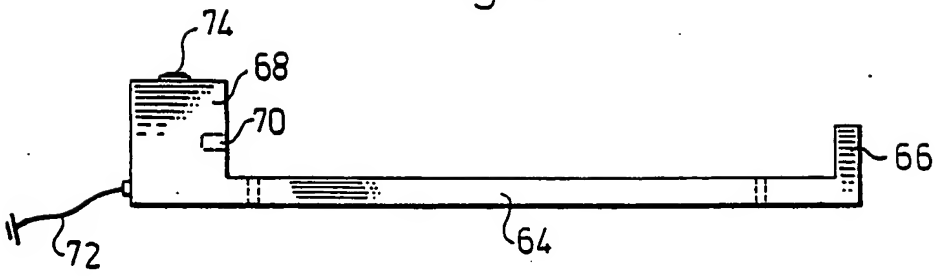
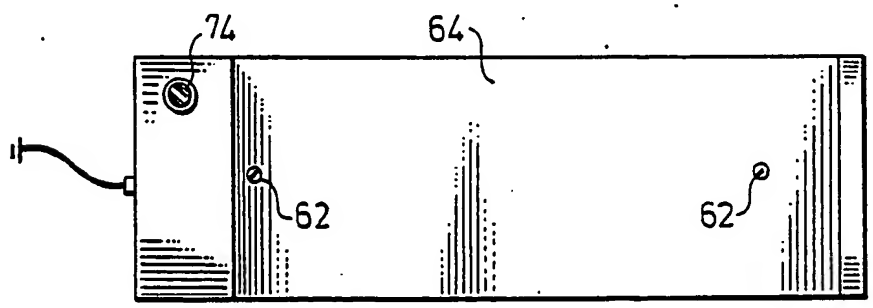


Fig. 9



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE86/00511

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [5]

According to International Patent Classification (IPC) or to both National Classification and IPC 4

E 05 G 1/00, 1/12, E 05 B 47/00, 49/00

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC 4	E 05 G 1/00, /04, /12, /08; E 05 B 47/00, 49/00-/06, 65/52
Nat cl	68e:4; 68a:39

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [8]

SE, NO, DK, FI classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
Y	SE, B, 405 754 (TELEFON AB LM ERICSSON) 2 September 1978 & NL, 7802003 BE, 864264 FR, 2382211 DE, 2807566 JP, 53109697 AU, 33508/78 GB, 1576567 CA, 1093898 CH, 627517 AU, 514774 SE, 7702239	1-10
Y	FR, A, 2 445 429 (LEUAVASSEUR ET AL) 25 July 1980	1-10
Y	US, A, 4 099 752 (GERINGER) 11 July 1978 & US, 4021065	2
Y	FR, A, 2 311 912 (GUIDOTTI) 17 December 1926	2

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
1987-01-26	1987 -01- 28
International Searching Authority	Signature of Authorized Officer
Swedish Patent Office	Christer Wendenius

Form PCT/ISA/210 (second sheet) (January 1985)

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

II Fields Searched (cont).

US Cl 109:25, 29-33, 38, 43;
301:172;
292:201, 144

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [1]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers ..... because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers ....., because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers ....., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [2]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
Y	DE, A, 3 300 170 (DATA-LOSCH GS) 12 July 1984	1-10
Y	DE, A, 2 437 501 (C & A. BRENNINKMEYER) 12 February 1976	1-10
Y	DE, A, 2 625 282 (THE ILLINOIS LOCK CO ET AL) 30 December 1976 & US, 3979647 BE, 842748 NL, 7606176 FR, 2314335 LU, 75152 GB, 1525033 AU, 14783/76 CA, 1043443 JP, 52022000 SE, 7606595	1, 4, 9
Y	SE, B, 411 137 (CEDERGREN) 3 December 1979 & NL, 7803843 FR, 2387345 DE, 2814410 JP, 53128875 AU, 34868/78 US, 4273478 GB, 1593041 AU, 515144 CH, 631232 SE, 7704195	1-10
Y	DE, B, 2 202 930 (G.A.O. GESELLSCHAFT FÜR AUTOMATION UND ORGANISATION mBH) 31 August 1972 & FR, 2127738 CH, 551322 GB, 1375926 US, 3851602 AT, 315019	1-10